DATA-CONTROL SYSTEMS, INC.

SERIES 1100
PCM PROCESSING SYSTEMS

THE PCM DECOM WITH MUCH MORE THAN A "ONE-TRACK MIND."

- IBM Compatible Tape Generation,
- IBM Compatible Tape Playback.
- Simultaneous Processing from 16 Sources.
- Simultaneous Readout of Raw and Processed Data.
- Exclusive Core Memory for Arithmetic and Processing Functions.

- Correlation of Multi-Link Data.
- Maintains Synchronization through Memory Read and Programming Errors.
- Limits Checks.
- Low Initial Cost.
- Low Cost Modular Expansion.

The DCS 1100 Series PCM Systems reflect the present trend of the aerospace industry towards a PCM system which can be procured as a moderate-cost, highly-complex data processing system, or as a low-cost, expandable basic PCM Decommutator.

The DCS method of expansion is by completely compatible modular units which provide the functions of bit synchronization, format synchronization serial-to-parallel conversion, and data word routing. Selection and routing is via matrix pegboard, thumbwheel, or IBM card. Readout is provided in analog, binary coded decimal and direct engineering units. Printout is provided in binary, decimal or alphanumeric symbols, and visual analysis of data via bar-chart CRT. In addition, *simultaneous* synchronization and decommutation of several PCM signals is provided by a unique parallel multiplexer allowing selection and correlation of data words from various asynchronous links without the tedious and time-consuming replays and manual time correlation.

True data processing, including arithmetic functions, is accomplished by the inclusion of a processor and an appropriate processor interface unit. These units in conjunction with the parallel multiplexer provide an additional simultaneous link of processed data, available for display by any of the methods described above. The processor also allows system control by software methods via teletypewriter, papertape and magnetic tape. The processor also allows the all-important function of formatting an IBM compatible magnetic tape record and analysis of raw telemetry data and output to CRT display, X-Y plotter, and line printer. IBM compatible tapes may also be played back for further analysis and display via the data processor.

The simultaneous capability also allows processing a single PCM signal through multi-synchronization links operating with different bit and format synchronization parameters. Data is extracted from the link displaying the more valid sync status. Multi-link use also provides automatic resolution of bi-phase ambiguity. If rapid switching from one PCM format to another is desired, data is immediately available without the heretofore necessary time period involved for re-synchronization to a new format.

Links are provided with a status flag to indicate data validity. In this manner, the operator or processor may select only those links which are valid for data display or processing.

The basic system involves only one link and is described as the 1100 System. The simultaneous function when included converts the system to an SR-1100-X, in which the X determines the number of simultaneous links desired. Inclusion of a processor with interface converts the basic system to an RP-1100 System. A system with all functions (simultaneous, readout, and processor) is described as an SPR-1100-X System with the X again determining the number of simultaneous links desired.
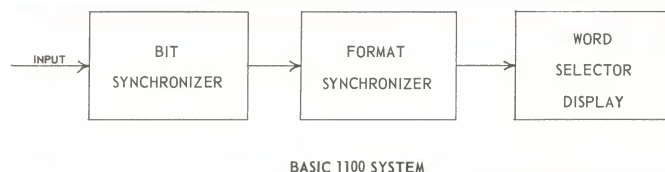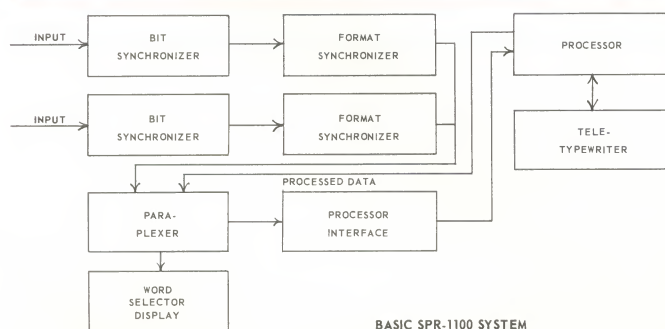

BASIC 1100 SYSTEM

The Basic 1100 System provides bit synchronization and detection, frame, sub-frame, and sub-sub-frame or word synchronization, serial to parallel conversion, and selection and display of 20 discrete, super-commutated or sub-commutated words from a single input PCM link. A Simulator may be added, and the Basic System is easily expanded to any of the complex configurations.

BASIC SR-1100 SYSTEM
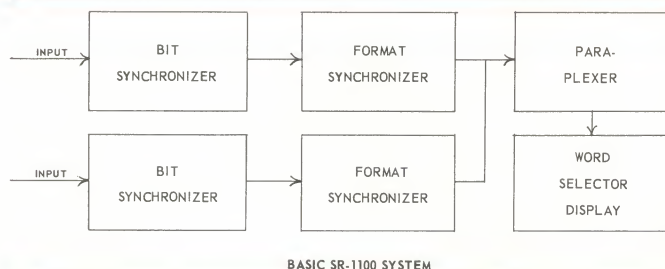
The Basic SR-1100 System provides simultaneous decommutation from two PCM input links. The two input formats may be synchronous or asynchronous, and word selection from either link is made in one Word Selector Display Unit. One PCM signal may be processed through both synchronization chains with dissimilar parameters set in the Bit and Format Synchronizers. The synchronization chain indicating most valid data is selected for word display.

BASIC RP-1100 SYSTEM
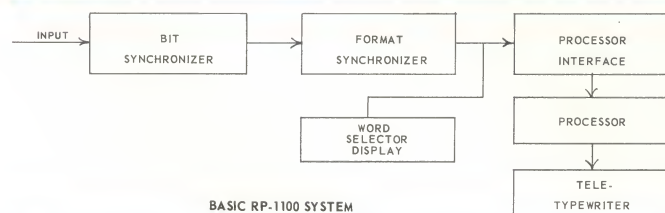
The Basic RP-1100 System provides all synchronization functions and selection and display of 20 words from one input PCM link. In addition, data, processing, including arithmetic functions and system control by software via teletypewriter, limit checks and printout by teletypewriter are provided. IBM compatible tapes may be generated by addition of a Digital Tape Handler and Buffer.

BASIC SPR-1100 SYSTEM

The Basic SPR-1100 System combines all advantages of simultaneous decommutation, selection and readout, and processor functions. The processor may determine validity of data and process only data from a valid link. Limit checks and time correlation of words from two dissimilar formats may be processed. Arithmetic functions are performed on words within one format or on words within both formats and the results analyzed via Teletypewriter or Analog and Binary Displays. IBM compatible tapes may be generated by addition of a Digital Tape Handler and Buffer.

SERIES 1100 BASIC UNITS

BIT SYNCHRONIZERS:

GPS-5

10 BPS to 1.6 MBPS NRZ

Acknowledged throughout the industry as the outstanding Bit Synchronizer and Detector. Has set the highest standards in synchronization, detection and reliability, and in many instances has replaced higher priced, bulky, competitive synchronizers when real time data was introduced for processing. Accepts RZ, NRZ-L, NRZ-M, NRZ-S, BI-phase-L. Remote selection of code and 10 preset bit rates.

GPS-6

Identical to the GPS-5 in all synchronization and detection techniques. Manual selection of bit rate. All silicon version available. Customer evaluations indicate the GPS-6 and GPS-5 out perform all other available synchronizers in every parameter tested. Both units modular in design and only 3½ inches in height.

GPD-6

Demodulates PCM phase-shift-keyed carriers, synchronizes and detects PCM bit stream and provides Data, Clock and Carrier Frequency. Accepts PSK-NRZ-L, PSK-NRZ-M, PSK-NRZ-S, RZ, NRZ-L, NRZ-M, NRZ-S, BI-PHASE-L, BI-PHASE-M, BI-PHASE-S. Carriers from 5Hz to 1.2 MHz and bit rates from 10 BPS to 1.6 MBPS NRZ and 5 BPS to 800 KBPS RZ & BI-PHASE types. Adjustments and indicators for bit rate, loop phase error, signal quality. All silicon design. Bit detection is within 1 db of theoretical at all bit rates and for all code types including bi-phase.

PCM SIMULATOR:

1031
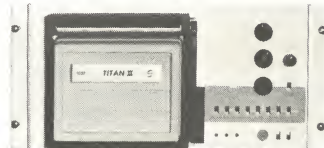
Generates all present and forseeable PCM formats. Bit rate continuously adjustable from 3 BPS to 1.6 MBPS NRZ, 1.5 BPS to 800 KBPS RZ and Bi-Phase. Noise and jitter may be introduced from external source. Provides RZ, NRZ-L, NRZ-M, BI-PHASE-L code types. Common data word selectable from front panel and staircase dynamic data available by front panel switch.

FORMAT SYNCHRONIZER:

1110
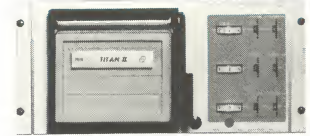
Extremely versatile frame, sub-frame, sub-sub-frame and word synchronizer. Utilizes the industry accepted BCVR programming pioneered by DCS. Provides synchronization by a superior search, check and lock pattern integration technique. Outputs parallel data with identification and sync status. Covered Pre-Programmed Patch boards provided. Number of Word Selector Units not limited by any loading restriction, excellent reliability and maintainability.
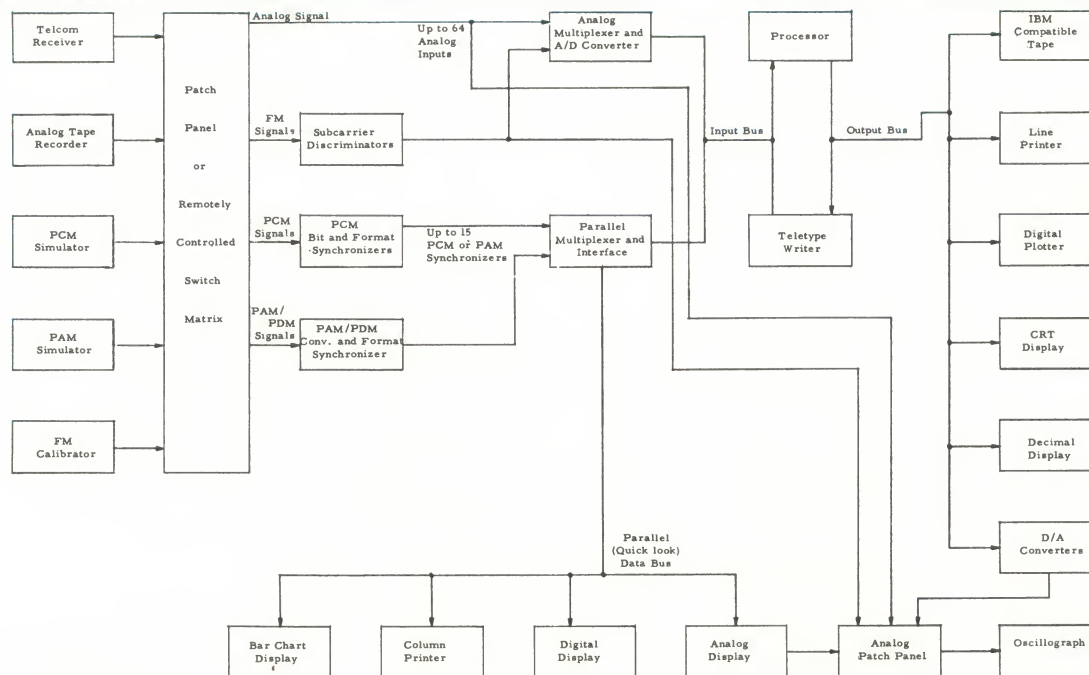
WORD SELECTORS:

1020
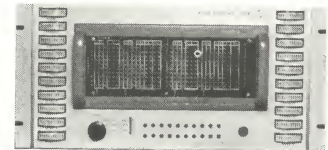
1022
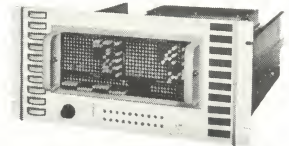
Word selection of up to 20 discrete, sub-commutated or super-commutated words from any conceivable format and display on front panel analog meters or eight-bit binary lamps. Selection is by rapidly configured peg board (no patch cords!) in straight binary or BCVR depending on PCM format. Also provides selection of words from up to 16 simultaneous formats from 16 Format Synchronizers via the DCS Paraplexer. Entire pegboard may be changed for extremely rapid change of selected words. Units provide calibration signal for full scale, mid-scale and zero-scale data. Digital-to-Analog Converters provide eight-bit conversion. Model 1020 selects, converts and displays 20 analog channels. Model 1022 provides 10 analog and 10 binary channels. Other units available with word selection by IBM card or thumbwheels, any number of Word Selectors may be used with one Model 1110 as there is no restriction due to loading effects.

PARAPLEXER-INTERFACE:

1190A

The model 1190A is the Basic Paraplexer-Interface Unit. It merges parallel data from up to four sources and provides interface to the Telemetry Processor. Other separate Paraplexer Units of the 1180 series available for merging data from up to 16 sources.

Telcom Receiver — Analog Signal

Analog Tape Recorder — FM Signals

PCM Simulator — PCM Signals

PAM Simulator — PAM/PDM Signals

FM Calibrator

Patch Panel or Remotely Controlled Switch Matrix

Subcarrier Discriminators

PCM Bit and Format Synchronizers

PAM/PDM Conv. and Format Synchronizer

Up to 64 Analog Inputs

Analog Multiplexer and A/D Converter

Up to 15 PCM or PAM Synchronizers

Parallel Multiplexer and Interface

Processor

Input Bus — Output Bus

Teletype Writer

IBM Compatible Tape

Line Printer

Digital Plotter

CRT Display

Decimal Display

D/A Converters

Parallel (Quick look) Data Bus

Bar Chart Display — Column Printer — Digital Display — Analog Display — Analog Patch Panel — Oscillograph

TELEMETRY SYSTEM EXPANDED FROM SERIES 1100 PCM SYSTEM

IF YOU HAVE A PCM REQUIREMENT, OR IF YOUR PRESENT PCM DECOM HAS A "ONE-TRACK MIND" CONTACT ANY OF THE DCS FIELD OFFICES.

NORTHEAST DISTRICT OFFICE
Data-Control Systems, Inc.
East Liberty Street
Danbury, Connecticut 06810
Phone: 203-743-9241
TWX: 203-744-1999

District Manager .... Robert F. Mei
Engineering Representative .... Mark O. Genest
Service Engineer .... Joseph P. Bupivi

CENTRAL ATLANTIC DISTRICT OFFICE
Data-Control Systems, Inc.
Suite 308 Metropolitan Bldg.
8720 Georgia Avenue
Silver Spring, Maryland
Phone: 301-587-1965
TWX: 710-825-9644

District Manager .... John R. Adams
Engineering Representative .... Thomas J. Blazek
Engineering Representative .... Donald L. Post
Service Engineer .... Joseph P. Bupivi

SOUTHEAST DISTRICT OFFICE
Data-Control Systems, Inc.
116-B Park Avenue, South
Winter Park, Florida 32789
Phone: 305-644-5654

District Manager .... Harry W. Collison
Branch Manager .... Thomas G. O'Donnell
Service Engineer .... John T. Winterton

BRANCH OFFICE
Data-Control Systems, Inc.
Clinton Bldg., 2109 W. Clinton Ave.
Huntsville, Alabama 35805
Phone: 205-536-4907
Engineering Representative .... David R. Suggs

SOUTHWEST DISTRICT OFFICE
Data-Control Systems, Inc.
Suite 200, 2750 Bellflower Blvd.
Long Beach, California 90815
Phone: 213-425-1265
TWX: 213-774-3089

District Manager .... Robert C. Johnson
Engineering Representative .... A. V. Mallan
Service Engineer .... Donald T. Sullivan

NORTHWEST/SOUTH-CENTRAL DISTRICT OFFICE
Data-Control Systems, Inc.
P. O. Box 613
501 Washington Street
Santa Clara, California 95050
Phone: 408-241-6820
TWX: 408-287-6417

District Manager .... William C. Wagner
Engineering Representative .... Fredric Ferry

BRANCH OFFICE
Data-Control Systems, Inc.
Esquire Suite
1400 First National Bank Bldg., East
Albuquerque, New Mexico 87108
Phone: 505-265-8033
Engineering Representative .... Joseph S. Lombardo

DATA-CONTROL SYSTEMS INC.
Instrumentation for Research

Long Beach • Santa Clara • Silver Spring • Winter Park • Huntsville • Albuquerque • Paris, France
Home Office: E. Liberty St., Danbury, Conn. • 743-9241 Area Code 203 • TWX: 203-744-1999

SS (Series 1100) -01
.7M   0866